University of Zurich[UZH]

**Zurich Open Repository and Archive**
University of Zurich
University Library
Strickhofstrasse 39
CH-8057 Zurich
www.zora.uzh.ch

Year: 2016

# Age and gender differences in implicit motives

Denzinger, Ferdinand ; Backes, Sabine ; Job, Veronika ; Brandstätter, Veronika

Abstract: Research on age differences in implicit motives is rare and has shown contradictory results. We investigated age and gender differences in implicit motives (achievement, power, affiliation and intimacy), measured by the Picture Story Exercise (PSE), in an extensive, heterogeneous dyadic sample of 736 adults aged 20–80 years. Data were analyzed with a multilevel approach. Results indicate lower motive scores in all four measured motives in aged as compared to young adults but higher scores in activity inhibition. Further, women scored higher in affiliation and intimacy motives than men, while men scored higher in achievement and power motives and in activity inhibition than women. Possible underlying affective and neuroendocrinological processes of age dependent change in implicit motives are discussed.

DOI: https://doi.org/10.1016/j.jrp.2016.09.003

Posted at the Zurich Open Repository and Archive, University of Zurich
ZORA URL: https://doi.org/10.5167/uzh-128325
Journal Article
Accepted Version

The following work is licensed under a Creative Commons: Attribution-NoDerivatives 4.0 International (CC BY-ND 4.0) License.

Originally published at:
Denzinger, Ferdinand; Backes, Sabine; Job, Veronika; Brandstätter, Veronika (2016). Age and gender differences in implicit motives. Journal of Research in Personality, 65:52-61.
DOI: https://doi.org/10.1016/j.jrp.2016.09.003

Accepted Manuscript


# Age and Gender Differences in Implicit Motives

Ferdinand Denzinger, Sabine Backes, Veronika Job, Veronika Brandstätter

PII: S0092-6566(16)30131-3
DOI: http://dx.doi.org/10.1016/j.jrp.2016.09.003
Reference: YJRPE 3602

To appear in: *Journal of Research in Personality*

Received Date: 30 June 2016
Revised Date: 1 September 2016
Accepted Date: 10 September 2016

Please cite this article as: Denzinger, F., Backes, S., Job, V., Brandstätter, V., Age and Gender Differences in Implicit Motives, *Journal of Research in Personality* (2016), doi: http://dx.doi.org/10.1016/j.jrp.2016.09.003

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT



# Age and Gender Differences in Implicit Motives

Ferdinand Denzinger, Sabine Backes, Veronika Job, and Veronika Brandstätter

University of Zurich

September 01, 2016

## Author Note

Ferdinand Denzinger, Department of Psychology - Psychology of Motivation, Volition, and Emotion, University of Zurich, Switzerland, f.denzinger@psychologie.uzh.ch

Sabine Backes, Department of Psychology - Psychology of Motivation, Volition, and Emotion, University of Zurich, Switzerland, s.backes@psychologie.uzh.ch

Veronika Job, Department of Psychology – Developmental Psychology: Adulthood, University of Zurich, Switzerland, v.job@psychologie.uzh.ch

Veronika Brandstätter, Department of Psychology - Psychology of Motivation, Volition, and Emotion, University of Zurich, Switzerland, v.brandstaetter@psychologie.uzh.ch.

Correspondence concerning this article should be addressed to

Veronika Brandstätter, Department of Psychology - Psychology of Motivation, Volition, and Emotion, University of Zurich, Binzmuehlestrasse 14/6, 8050 Zurich, Switzerland, v.brandstaetter@psychologie.uzh.ch.

## Abstract

Research on age differences in implicit motives is rare and has shown contradictory results. We investigated age and gender differences in implicit motives (achievement, power, affiliation and

ACCEPTED MANUSCRIPT


intimacy), measured by the Picture Story Exercise (PSE), in an extensive, heterogeneous dyadic sample of 736 adults aged 20 to 80 years. Data were analyzed with a multilevel approach. Results indicate lower motive scores in all four measured motives in aged as compared to young adults but higher scores in activity inhibition. Further, women scored higher in affiliation and intimacy motives than men, while men scored higher in achievement and power motives and in activity inhibition than women. Possible underlying affective and neuroendocrinological processes of age dependent change in implicit motives are discussed.

*Keywords:* implicit motives, achievement, affiliation, intimacy, power, activity inhibition, age differences, gender differences

ACCEPTED MANUSCRIPT

ACCEPTED MANUSCRIPT


## 1. Introduction

Implicit motives for achievement, power, affiliation, and intimacy are motivational dispositions that orient and energize behavior outside a person's conscious awareness (McClelland, Koestner, & Weinberger, 1989). They are conceived of as individual characteristics that are acquired early during the preverbal phase of life through the repeated experience of motive-satisfying incentives. Accordingly, they were treated as a stable aspect of an individual's personality (McClelland, 1980). So far, only few studies investigated age-dependent differences of implicit motive dispositions across adulthood. The results of these studies were mixed. While some studies have reported higher scores of implicit motives in aged adults (e.g., Valero, Nikitin, & Freund, 2014), others have found lower scores (e.g., Veroff, Reuman, & Feld, 1984). These inconsistent findings may be ascribed to small sample sizes and differing types of motive measurement.

The present research tests the assumption that implicit motives decrease in old age. We ground this hypothesis on research documenting age-dependent changes in affective and neuroendocrinological reactivity (e.g. Röcke & Brose, 2013; Ferrari et al., 2001). These changes should result in reduced responsiveness to affective motive-specific incentives in their anticipation as well as during enactment. Therefore, we assume that aged as compared to middle aged and young adults reach lower implicit motive scores in all three motive-domains.

### 1.1. Implicit motives

Since the very beginnings of psychological research, people have been interested in the motivational processes that underlie human behavior. What is important to human beings? What do individuals strive for? To set a research framework to investigate these fundamental questions David McClelland and his colleagues (McClelland, Atkinson, Clark, & Lowell, 1953) introduced

ACCEPTED MANUSCRIPT


the concept of *implicit motives*. They defined implicit motives as enduring, mostly unconscious preferences for specific classes of affective incentives (McClelland, 1985; Schultheiss, 2008) and suggested that these motives orient and energize behavior directed to specific activities or affective experiences (McClelland, 1985; McClelland et al., 1989; Schultheiss, 2008).

Three motives have predominantly captured researchers' attention. They have been seen as the primary motives and are called the "big three": the achievement motive, the power motive, and the affiliation/intimacy motive (McClelland, 1985). The *achievement motive* is the need to accomplish difficult activities in competition with a standard of excellence (*n* Achievement). The *power motive* is the need to have impact on others (*n* Power). The *affiliation motive* is the need to establish and maintain positive relations with other persons (*n* Affiliation) (Schultheiss, 2008). The *intimacy motive* (*n* Intimacy) is conceptually similar to the affiliation motive since it aims at the establishment and maintenance of positive relationships, too. However, these two motives can be differentiated: The intimacy motive is the need to have close relationships to familiar persons, while the affiliation motive can also be satisfied through friendly interactions with strangers or acquaintances (McAdams, 1980).

Implicit motives develop through affective experiences in early pre-lingual childhood (e.g. power motive: experience of positive affect as a consequence of having impact on others) (McClelland & Pilon, 1983). They can be aroused by particular incentives that are linked to affective experiences (McClelland et al., 1953). However, implicit motives are not verbally represented and they operate mostly outside a person's awareness. Due to their unconscious nature, it is not possible to measure implicit motives with self-report questionnaires. Instead, implicit motives are assessed with a projective measurement technique that relies on imagination processes embracing affective reactions to pictorial cues. This technique is called *Picture Story*

ACCEPTED MANUSCRIPT


*Exercise* (PSE) and is derived from the Thematic Apperception Test (Morgan and Murray, 1935). In the PSE, participants are confronted with different picture cues that show persons acting in different social situations (e.g., a couple sitting on a bench by the river) evoking fantasies about how this situation (could develop) in order to satisfy needs. Participants are instructed to immerse into these situations and into the perspective of the depicted persons. Through the imagination process of need satisfaction, participants anticipate particular affective feelings that are associated with their implicit motives and, subsequently, motive specific affective feelings and thoughts emerge in the written imaginative stories. Thus, these picture cues elicit a motivational response (Pang, 2010).

Research documents validity of implicit motive scores assessed with the PSE for predicting behavior (McAdams & Vaillant, 1982; McClelland & Boyatzis, 1982; McClelland et al., 1989). For instance, a higher implicit achievement motive predicted higher scores on different performance tasks (deCharms, Morrison, Reitman, & McClelland, 1955; Biernat, 1989; Brunstein & Hoyer, 2002) and the affiliation and intimacy motives predicted the frequency of affiliative interactions (e.g. conversations, letter writing; McAdams & Constantian, 1983). In sum, differences in implicit motives have far-reaching consequences on behavioral outcomes.

Recent research suggests that implicit motives are linked to endocrinological responses. Researchers showed that the stimulation of implicit motives is closely tied to the release of specific hormones (e.g., power motive and testosterone and estradiol: Schultheiss & Rohde, 2002; Schultheiss, 2013; achievement motive and cortisol: Schultheiss, Wiemers, & Wolf, 2014; Yang, Ramsay, Schultheiss, & Pang, 2015; affiliation motive and dopamine and progesterone: McClelland, Patel, Stier, & Brown, 1987; Schultheiss, 2013). For example, men with a high power motive respond with elevated salivary testosterone after winning a competition. This

ACCEPTED MANUSCRIPT


increase in testosterone, in turn, mediates better learning of the behavior that preceded the victory (Schultheiss & Rhode, 2002). In sum, hormones play a key role with regard to the motive specific affective experience. They accompany the satisfaction of an implicit motive and reinforce the learning of motive satisfying behavior (Schultheiss & Rohde, 2002).

Several studies found gender differences in the strength of implicit motives (e.g. Stewart & Chester, 1982; McAdams, Lester, Brand, McNamara, & Lensky, 1988; Schultheiss & Brunstein, 2001; Pang & Schultheiss, 2005; Drescher & Schultheiss, 2016). Women scored significantly higher on the affiliation and intimacy motive in these studies, but not on the achievement or power motive. These differences also remained significant when controlling for the higher verbal fluency of women, responsible for a higher number of written words in the motive test (Schultheiss & Brunstein, 2001; Drescher & Schultheiss, 2016).

**1.2. Activity inhibition**

In research on implicit motives, *activity inhibition* was identified as an important moderator of the relationship between implicit motives and various outcomes. Activity inhibition originally was defined as the extent to which persons try to keep their emotional-motivational impulses under control (McClelland, Davis, Kalin, & Wanner, 1972; for an overview, see Schultheiss & Brunstein, 2002). It is measured by counting the number of negating words (no, not) in the stories people write in a Picture Story Exercise (Schultheiss & Brunstein, 2002). Recent writings propose a theoretical extension of the concept of activity inhibition linking it to its neural correlates (Schultheiss, Riebel, & Jones, 2009). Schultheiss et al. (2009) propose that activity inhibition is an indicator for right hemispheric laterality, that is, a "propensity to engage functions of the right hemisphere (RH) and disengage functions of the left hemisphere (LH)" (p. 392). This conception of activity inhibition coincides with the literature on neurobiological

ACCEPTED MANUSCRIPT


foundations of motivated behavior, which shows that greater right frontal activation is associated with trait BIS (behavioral inhibition system; Gray, 1982) and avoidance behavior (Amodio, Master, Yee, & Taylor, 2008; Coan & Allen, 2003; Hewig, Hagemann, Seifert, Naumann, & Bartussek, 2004; Rutherford & Lindell, 2011; Sutton & Davidson, 1997).

The moderating role of activity inhibition has been shown for all three motive-domains. For example, researchers found that the implicit affiliation motive interacts with activity inhibition in predicting partner abuse committed by stressed women (Mason & Blankenship, 1987). Furthermore, only people with a high power motive who also score high on activity inhibition act highly convincing and are able to persuade their counterparts (Schultheiss & Brunstein, 2002). Hence, activity inhibition is an important moderator because it determines whether and how a person enacts the behavior suggested by a given motive, either in an approach-oriented, impulsive way or by inhibiting momentary impulses. It also determines if a person will channel the behavior in a socially appropriate and goal-directed way.

**1.3. The normative development of implicit motives in old age**

In the present research we assume that aged individuals show lower motive scores than younger individuals due to specific affective and physiological processes that change over the life course. These changes are thought to influence the affective and cognitive reactions to motive related incentive cues and thus cause a reduction in the strength of implicit motives.

First, although there are still many unresolved issues in the study of age-related changes in emotional perception and processing, there is strong evidence that aged adults react less strongly to specific affective situations than younger adults (for an overview: Scheibe & Carstensen, 2010; Röcke & Brose, 2013). A reduced affective reactivity might be due to the striving of aged adults for emotional stability. There is empirical evidence that aged adults show

ACCEPTED MANUSCRIPT


less variability in positive and negative affect as compared to young adults (Röcke, Li, & Smith, 2009; Röcke & Brose, 2013). The authors mention various reasons for this effect: To begin with, aged adults are experienced in dealing with their emotions leading to emotional stability through processes of emotion regulation. Furthermore, older adults' environment is very stable, because aged adults prefer familiar daily routines and their life-contexts are overall changing less than those of younger adults. Besides, it is necessary for aged adults to optimize their emotion regulation, because unpleasant events leading to mood impairments (e.g., health related events) are more likely to occur in later life than in young adulthood. Finally, a more consolidated self-concept protects the aged adults from affective short-term variations. These reasons lead to the assumption that aged adults might actively try to inhibit affective reactions to emotionally arousing situations. This assumption is supported by further empirical studies. For example, Gross et al. (1997) showed that aged adults reported greater emotional control, but lesser emotional expressivity than younger adults. Another, more recent study showed that aged participants rated high-arousing stimuli as most unpleasant, while they rated low-arousing stimuli as most pleasant. The authors assume a gradual decrease of appetitive activation over the course of life (Keil & Freund, 2009). Hence, it is well conceivable that older adults do not want to experience strong (anticipatory) emotions, when they are confronted with affective incentives. This might affect the activation of implicit motives: The picture cues of the PSE were designed to elicit specific affects and, subsequently, implicit motives. However, the anticipation of motive satisfying affect is a necessary condition for triggering implicit motives (e.g. Job & Brandstätter, 2009; Job, Bernecker, & Dweck, 2012; Schultheiss & Brunstein, 1999). As a consequence of the lowered affective responsiveness to the picture cues in aged adults, fewer implicit motives might

ACCEPTED MANUSCRIPT


emerge in the imaginative stories, constituting a reduced expression of implicit motives in older adults.

Second, age dependent hormonal changes can cause a decrement in implicit motives. As reported above, the release of neurohormones plays a key role in motivation by implicit motives (McClelland et al., 1989). There is a strong relationship between the stimulation and satisfaction of implicit motives and the release of specific hormones, e.g. testosterone, estradiol, cortisol, dopamine and progesterone (Schultheiss, 2013; Schultheiss et al., 2014; McClelland et al., 1987). A complex interplay of these neurohormones with hypothalamic nuclei affects various motivational functions such as dominance and social affiliation (Schultheiss, 2013). Researchers argue that changing levels of neurohormones influence the brain areas responsible for the regulation of motivational functions such as responding to conditioned cues (Schultheiss, 2013).

There is research showing an age-related decline in hormonal levels (e.g. Ferrini, & Barrett-Connor, 1998), a decline in the sensitivity to these neurohormones (e.g. Conrad & Bimonte-Nelson, 2010), and age-related impairment in brain structures (e.g. hypothalamus; Ferrari et al., 2001) that are responsible for processing these neurohormones. Presumably, these age-related changes have important consequences on the procession of affective signals and the affective responses in motive-related situations. Therefore, we assume that along with a decline in hormonal release and sensitivity, there is a decline in the strength of implicit motives. Researchers assume that the release of specific neurohormones enhance the rewarding effects in motive-related situations (Schultheiss, 2013). Subsequently, a decline in hormonal release may reduce the rewarding effects of a motive-related situation. The repeated experience of muted affective reactions makes the motive-specific behavior less satisfying and rewarding. Eventually,

ACCEPTED MANUSCRIPT


this will result in a decrease of implicit motive strength since motive-specific behavior is no longer reinforced.

Finally, we assume that activity inhibition also changes across the lifespan. However, in light of contradicting theoretical points of view, two competing hypotheses emerge. On the one hand, one could expect an age-related decline in activity inhibition as aged adults show more socially inappropriate behavior than younger adults because they face higher levels of impulsivity, that is, lower impulse control (Morales-Vives & Vigil-Colet, 2012; von Hippel & Dunlop, 2005). In the same vein, in light of the neurobiological conception of activity inhibition as an indicator of the propensity to engage right hemispheric functions a decline in activity inhibition would be predicted. There is some evidence that the right hemisphere is more affected by aging than the left hemisphere and that the hemispheric asymmetry decreases in older adults (Dolcos, Rice, & Cabeza, 2002). On the other hand, recent research suggests that age is associated with better self-regulation (for an overview: Hennecke & Freund, in press). For example, aged adults revealed better self-regulation in eating behavior, affect and thought during a diet. If activity inhibition is seen as a marker of people's tendency to control their motivational impulses, one would assume a positive relationship with age.

In order to test the assumption of age-related differences in motive strength we deemed it necessary to measure all three implicit motive domains including activity inhibition in a large sample of adults covering a wide age range, and last not least, to control for several variables that might affect motive strength. Therefore, we tested implicit achievement, power, affiliation, and intimacy motives, as well as activity inhibition, considering various control variables.

## 2. Method

### 2.1. Participants and procedure

ACCEPTED MANUSCRIPT


Data is derived from an extensive study investigating intimate relationships and stress. In total, 736 participants[1] (368 heterosexual couples) were recruited by means of advertisements in the local newspapers, in local radio stations, and via announcements posted on bulletin boards. The majority of the sample was Swiss German (85 %); 3 % gave no information about their nationality, 8 % identified themselves as German, and the rest as dual citizenship owners (Swiss and other nationality) or other. The sample consists of three age groups: young adults ranging from 20 to 35 years ($n$ = 244, $M$ = 27 years, $SD$ = 5 years), middle-aged adults ranging from 40 to 55 years ($n$ = 250, $M$ = 47 years, $SD$ = 5 years) and aged adults ranging from 65 to 80 years ($n$ = 242, $M$ = 71 years, $SD$ = 5 years). As a result of the dyadic structure of the sample, gender of the participants is almost uniformly distributed. One woman refused the assessment of implicit motives and was excluded from all analyses. With regard to participants' highest degree of education, our sample appears to be of mixed educational backgrounds. Table 1 shows an overview of the highest degree of education separated for females and males and also separated for the different age groups.

The data collection consisted of two parts. In the first part, participants were asked to complete some questionnaires at home and take them to the laboratory. In the second part, participants were invited to the laboratory at the university together with their partner. In addition to other questionnaires and measurements, they completed a handwritten individual assessment of implicit motives in an individual session with an experimenter. Couples received a payment of 100 Swiss Francs (approximately $103) in return for their participation.

**2.2. Measures**

Implicit motives were assessed with the Picture Story Exercise[2] (PSE; McClelland et al., 1989; Schultheiss, Pang, Robins, Fraley, & Krueger, 2007). Participants were provided with the

ACCEPTED MANUSCRIPT


standardized introduction proposed by Pang (2010) on a piece of paper. The following introduction advised the participants to write a short imaginative story about each of the following six pictures[3]: (1) ship captain, (2) woman in laboratory, (3) nightclub scene, (4) trapeze artists, (5) architect at desk, and (6) couple by river (Schultheiss & Brunstein, 2001).

> "In the Picture Story Exercise, your task is to write a complete story about each of a series of six pictures - an imaginative story with a beginning, a middle, and an end. Try to portray who the people in each picture are, what they are feeling, thinking, and wishing for. Try to tell what led to the situation depicted in each picture and how everything will turn out in the end." (Pang, 2010, pp. 135-136)

Participants were given four minutes to write each story. Thirty seconds before the end of time they were reminded by the experimenter to finish their narrative. At the end of the four minutes the experimenter told them to turn the page and proceed with the next picture. This procedure was repeated for all of the six pictures.

The content of each story was coded for motive specific content (achievement, power, and affiliation) by four independent coders following Winter's (1994) *Manual for scoring motive imagery in running text*. The coders were calibrated on an expert coding set in advance, and certified for scoring motive imagery in running texts. They reached an overall agreement of Cohen's Kappa at a minimum of 0.80 on the stories of 51 participants before they independently started coding the remaining PSE stories for this study. They coded all six stories of randomly assigned participants (partners were not separated) and were blind to age and gender of the participants. Equivocal scoring cases were periodically discussed.

The intimacy motive was scored separately by applying the coding manual by McAdams (1980) by two intensively trained and independent coders. They reached an overall agreement of

ACCEPTED MANUSCRIPT


Cohen's Kappa at a minimum of .85 on the stories of 16 participants before they separately started coding the stories. The additional coding of intimacy has the advantage that intimacy focuses more on the quality of intimate relationships than Winter's affiliation-intimacy codings. Activity inhibition was simply measured by counting the negation word "not" in the written texts (German: "nicht"; Schultheiss & Brunstein, 2002).

All codings for one motive were summed up per person and per picture to compute a score for every motive in each picture and also per person across all six pictures to obtain a total motive score for each person. Table 2 and 3 show the two-tailed Pearson correlations among the total motive scores and age and also the descriptive statistics of the raw total motive scores separated for women, men and age groups.

**3. Results**

As we used data from couples, observations are statistically dependent (partners are nested within a dyad). Therefore, we used multilevel models that allow controlling for the dependency between the partners' data. To test differences in number of written words and in implicit motive scores across age and gender, random intercept cross-sectional mixed effects models with the number of words or, in a separate analysis, the particular motive score as the dependent variables were conducted in the statistical software R (version: 3.1.3).

We tested the non-independence of number of written words, implicit motive scores, and activity inhibition between partners by calculating the intraclass-correlations (ICC). Implicit motives scores and activity inhibition were controlled for verbal fluency. Significant ICC values speak for the non-independence of the data within the couple and the endorsement of multilevel modelling (Bliese, 2000; Nezlek, 2008). ICCs were significant for the number of written words (ICC(1) = .45, $p < .001$) and for the achievement motive (ICC(1) = .13, $p < .01$). They were

ACCEPTED MANUSCRIPT


nonsignificant for the other motives and for activity inhibition (power: ICC(1) = .03, $p$ =.31; affiliation: ICC(1) = .05, $p$ = .16; intimacy: ICC(1) = .04, $p$ = .20; activity inhibition: ICC(1) = .07, $p$ = .10). Because the number of written words is a curtailing control variable the significant ICC speaks for the use of multilevel modeling.

Additional analyses revealed that linear models fit the data better than quadratic or cubic models. Therefore, we included the age group (young, middle-aged, aged) in all analyses not as a categorical variable, but the participant's individual age as a continuous variable. The usage of a continuous variable has the advantage that it keeps information about the actual age of the participants and enables linear transformations.

In all analyses protocol length (the total number of words written by each participant) was included as a control variable. This allowed us to take into account that motive scores and protocol length are typically highly correlated. Researchers typically residualize motive scores or else correct for protocol length whenever they use the motives as predictor variables (e.g., Pang 2010; Smith, Feld, & Franz, 1992). Since motive scores represent the outcome variables in the present analyses controlling for protocol length is adequate.

**3.1. Analysis of story length across age and gender**

First, we calculated multilevel regression analyses to predict number of written words based on gender and age. The analysis revealed significant differences in number of words for age and gender. Age negatively correlated with the number of written words, $b$ = -4.33, $SE$ = 0.29, $t(364)$ = -14.89, $p < .001$, and women wrote significantly more words than men, $b$ = -40.69, $SE$ = 6.41, $t(364)$ = -6.35, $p < .001$. Also the interaction term of age and gender was significant, $b$ = 1.02, $SE$ = 0.35, $t(364)$ = 2.92, $p < .01$. Simple slope analyses (Preacher, Curran, & Bauer, 2006) revealed that slopes corresponding to the gender of young participants (mean

ACCEPTED MANUSCRIPT


score of the first age group), slope = -62.58, $p < .001$, and middle-aged participants (mean score of the second age group), slope = -38.62, $p < .001$, differed significantly from zero. In these two age groups women wrote significant longer stories then men. In contrast, no gender differences in the number of written words were found for older participants (mean score of the third age group), slope = -15.68, $p = .12$ (Figure 1).

**3.2. Analyzing implicit motive scores across age and gender**

We tested separate multilevel regression models for achievement, power, affiliation, intimacy, and activity inhibition including age, gender, and their interaction as the focal predictors. The number of words and coder[4] were included as control variables. Gender was dummy coded (0 = women, 1 = men). Participants were divided into five groups. Four groups were coded by one of the four coders only. The fifth group was coded by the entire coding-team. Four coder dummy variables were created, each of them representing one of the four coders (1 = $coder_x$, 0 = all others). Participants of the fifth group ($N = 51$) had a value of zero on all four coder variables and represent the reference group against which the single coders are compared. Intimacy was separately coded by only two independent coders. The coders of intimacy were coded by one dummy variable. Age and number of words were centered on the grand mean, to avoid problems of multicollinearity and to simplify interpretation. Since the interaction between age and gender was nonsignificant in each analyses, it was dropped from the final models.

As expected, the number of written words significantly correlated with all four implicit motives as well as with activity inhibition (Tables 4-8). In addition, there was a coder-effect for the achievement and power motive scores confirming the necessity of controlling for coders in the analyses.

ACCEPTED MANUSCRIPT

ACCEPTED MANUSCRIPT


Regarding the achievement motive (Table 4), significant age differences, $b$ = -0.01, $SE$ = 0.00, $t(362) = -2.52$, $p < .05$, and significant gender differences appeared, $b$ = 0.20, $SE$ = 0.09, $t(362) = 2.23$, $p < .05$. Higher age corresponded with lower achievement motive scores and men showed higher achievement motive scores than women.

Regarding the power motive (Table 5), significant differences in age, $b$ = -0.01, $SE$ = 0.00, $t(362) = -2.60$, $p < .01$, and gender occurred, $b$ = 0.32, $SE$ = 0.11, $t(362) = 2.98$, $p < .01$. Age negatively correlated with power motive scores and men expressed more power than women.

Regarding the affiliation motive (Table 6), there were significant age differences, $b$ = -0.01, $SE$ = 0.00, $t(362) = -2.83$, $p < .01$, and significant gender differences, $b$ = -0.56, $SE$ = 0.12, $t(362) = -4.55$, $p < .001$. Higher age came along with lower affiliation motive scores. Further, replicating past research (Schultheiss & Brunstein, 2001), women scored higher on the implicit affiliation motive than men.

Regarding the intimacy motive (Table 7), again age, $b$ = -0.03, $SE$ = 0.01, $t(364) = -4.36$, $p < .001$, and gender differences appeared, $b$ = -0.65, $SE$ = 0.18, $t(364) = -3.57$, $p < .001$. Higher age corresponded with lower scores in the intimacy motive and women scored higher on the intimacy motive than men.

Regarding activity inhibition (Table 8), there were significant age, $b$ = 0.02, $SE$ = 0.01, $t(364) = 3.59$, $p < .01$, and gender differences, $b$ = 0.39, $SE$ = 0.15, $t(364) = 2.62$, $p < .01$. Higher age came along with more activity inhibition, and men showed more activity inhibition than women.

**4. Discussion**

ACCEPTED MANUSCRIPT


The aim of the present analyses was to examine age differences in implicit motives, measured through the Picture Story Exercise (PSE). As expected, significant age differences were found for all motive scores. The scores of achievement, power, affiliation, and intimacy motives were smaller with increasing age. In contrast, age was positively correlated with activity inhibition. Further, significant gender differences were found for all motives. Women showed higher scores in the implicit affiliation and intimacy motive than men, while men scored higher in the implicit achievement and power motive than women.

**4.1. Age differences in motive scores**

Results indicate a significant negative relationship between age and the scores of all four measured implicit motives. These results are in line with some research reporting age differences in the implicit power motive (Veroff et al., 1984; McClelland, Scioli, & Weaver, 1998; Franz, 1994; Schultheiss & Brunstein, 2001), the implicit achievement motive (Veroff et al., 1984; Franz, 1994), and the implicit affiliation and intimacy motive (Veroff et al., 1984; McClelland et al., 1998; Schultheiss & Brunstein, 2001). Our study confirmed these age differences in implicit motives with an extensive sample of adults covering the whole age range from 20 years to 80 years. We assume that age-dependent changes in affective and neuroendocrinological reactivity are responsible for these differences in implicit motive scores. As people age they get less responsive to emotional stimuli (Röcke & Brose, 2013) and therefore, as we assume, they respond less to the affective incentives typically activating an implicit motive. Further, attenuated hormonal responses (Ferrari et al., 2001; Ferrini & Barrett-Connor, 1998; Conrad & Bimonte-Nelson, 2010), might reduce the rewarding experience following motive-driven behavior, which may further reduce implicit motive strength in the long-term. Future research

ACCEPTED MANUSCRIPT


should test the specific mechanisms involved in the developmental changes in implicit motive dispositions.

Lowered scores in implicit motives in aged persons might have a far-reaching impact on the life of aged persons. It is well known that implicit motives orient, select, and energize behavior (McClelland, 1985) and, thus, influence the process of goal setting and attainment. A normative decline in implicit motives could entail that aged adults set fewer goals in the domains of power, achievement, affiliation and intimacy. They may further withdraw from environments that require high achievement effort, exerting power, or social affiliation (e.g. maintenance of big social networks).

However, it is important to consider possible alternative explanations. First, one could object that aged adults show lower implicit motive scores than younger adults, because they did understand the instructions of the PSE differently. Therefore, they might describe the pictures in detail instead of writing imaginative stories with motive content. Indeed, analyses of the written stories in our study showed that many aged adults actually described the pictures in detail instead of inventing an imaginative story. This finding, however, is not necessarily a proof for a misunderstanding of instructions because it is also consistent with our assumption of a lowered affective responsiveness to motive incentives in aged adults.

Second, it is possible that aged adults show deficits in the capacity to see things from another point of view (Bailey & Henry, 2008). In all of the pictures we used, different persons are depicted. Participants had to take the perspective of these persons to write imaginative stories about their feelings and thoughts. If it is difficult for aged adults to see the world from the perspective of the depicted persons, they might tend to describe the pictures. Thus, there might not necessarily be a misunderstanding of the instructions, but rather a deficit in responding to the

ACCEPTED MANUSCRIPT


picture cues because of lowered affective responsiveness or deficits in perspective taking in older adults. As this perspective taking is an integral part of how implicit motives are assessed we can not rule out this possibility while using the standard PSE. Maybe advancements in motive assessment will make it possible in the future to measure implicit motives without the premise of perspective taking.

Furthermore, one could object that the limited writing time of four minutes for each story was a confounding factor resulting in lowered implicit motives scores of aged participants. It might be necessary to allow the aged participants more writing time. Due to the workload for participants in our study, we gave all participants only four minutes to reduce their subject burden. This might have been too little time for older adults, who might take longer to comply with the task of writing a fantasy story. In future research, it should be tested whether the standard procedure of giving five minutes, suggested by Pang (2010), results in longer stories from older adults. However, Pang (2010) mentioned that reducing writing time to four minutes does not dramatically affect the amount of codable material. Besides, Bernecker and Job (2011) found that writing time is not a significant predictor of motive scores.

Personality research has also shown that various personality dispositions are less pronounced in old age than in young age (e.g., extraversion, openness; Specht, Egloff, & Schmukle, 2011). Researchers trace these changes back to environmental factors (social demands, life experiences) as well as to biological maturation. They assume that both factors are equally responsible for age-dependent changes in an interactive way (Specht et al., 2011). In our reasoning, we assumed biological maturation (changes in affective, cognitive and physiological functions) to be the main cause of age differences in implicit motives. We do not want to rule

ACCEPTED MANUSCRIPT


out, though, that specific environmental factors (such as social demands) could also be responsible for age differences in implicit motives.

Due to the cross-sectional character of the study, the age differences could be based on cohort effects or selective mortality. For example, did children born before or during World War II have fewer opportunities to develop high implicit motives than the later generations? Or, are there less highly motivated individuals represented in the older-participant sample because high implicit motives expose people to more mortality risks? An argument that speaks against pure cohort effect, is the fact that our sample of older participants in their 60ies to 80ies (born between 1930 and 1950) actually do not form an homogenous group as they grew up under completely different social and economic circumstances – in the years of great economic and politic upheaval prior to and during World War II vs. the beginning of a long period of peace and great economic prosperity in Western Europe. Nevertheless, only a cohort-sequential longitudinal design following participants from early adulthood into old age allows to distinguish variance in implicit motives caused by cohort effects or mortality from actual intra-individual age dependent changes.

With respect to activity inhibition, we had formulated two competing hypotheses. One could have either expected an age-related decline due to respective neuropsychological changes (Dolcos, et al., 2002; Schultheiss, et al., 2009; Sutton & Davidson, 1997), or an age-related increase due to better self-regulation capacities of aged individuals (Hennecke & Freund, in press). Our data support the latter hypothesis as we found a higher activity inhibition in older as compared to younger adults. We interpret this finding in accordance with Hennecke's and Freund's (2010, 2015) line of argument that aged adults show better self-regulatory abilities than younger adults. Researchers trace these self-regulatory improvements back to improvements in

ACCEPTED MANUSCRIPT


motivational competence and accumulated experiences across adulthood (Freund, Hennecke, & Riediger, 2010; Hennecke & Freund, 2010, 2015). They state that these improvements in self-regulation might also be due to age-related improvements in affect regulation skills and that "this route might be accessible to older adults even if their inhibitory skills might have already declined (Hasher et al., 1999)." (Hennecke & Freund, 2015, p. 16).

**4.2. Gender differences in implicit motive scores**

Women showed higher motive scores in affiliation and intimacy, while men showed higher motive scores in achievement, power, and activity inhibition. Previous research already found differences in implicit affiliation and intimacy motives (McAdams et al., 1988; Schultheiss & Brunstein, 2001; Drescher & Schultheiss, 2016). Yet, our findings of gender differences in achievement, power, and activity inhibition are new. Previous research did neither show any differences between men and women in the achievement and the power motive, nor in activity inhibition (Pang, 2010; Drescher & Schultheiss, 2016). One reason for these findings might be the composition of our sample. Men reported a slightly higher education than women (see Table 1). The gender differences in motive scores might be explained according to social structural factors (e.g. education) and occupational structures as Veroff et al. (1984) and Jenkins (1987, 1994) stated. Thus, the higher education of men in our sample might be an explanation of their higher achievement and power motive scores in our study. However, our data refutes this assumption: Although men reported a higher education than women, education is not correlated with the achievement ($r = .02$, $p = .60$) and the power motive scores ($r = .06$, $p = .09$).

An alternative explanation of gender differences in our study might be the specific sociocultural context of our sample. The present findings were obtained in Switzerland with a majority (more than 85 %) of Swiss German participants. Switzerland is a country with a

ACCEPTED MANUSCRIPT


comparatively strong focus on traditional values and traditional gender roles (Kelso, Cahn, & Miller, 2012; Bernardi, Ryser, & Le Goff, 2013) that might be responsible for a gender specific development of implicit motives. In more traditional sociocultural contexts, women are socialized to focus on affiliation and intimacy, men, in contrast, are socialized to focus on achievement and power (North & Fiske, 2014). Moreover, the late introduction of women's right to vote on a federal level in 1990 underpins this assumption and might explain, why Swiss women exhibit lower achievement and power motives than women in other countries (e.g., Drescher & Schultheiss, 2016).

Additionally, it might be possible that these gender differences are a typical characteristic of implicit motives similar to gender differences in explicit goals and life values. For example, recent research on gender differences in life goals demonstrated in many studies that women perceived power-related goals as less important than men (Gino, Wilmuth, & Brooks, 2015). A recent review showed that women expressed stronger preferences for interpersonal goals (e.g. focusing on family and community) than men, whereas men expressed stronger preferences for agentic goals (e.g. high impact careers, high social status) than women (Massey, Gebhardt, & Garnefski, 2008). Although we replicated these results on an implicit level with high statistical power, it is up to future studies to clarify the main reasons of emerging gender differences in implicit motives. Presumably, these gender differences are not only genetically determined, but also socialized.

**5. Conclusion**

The present study demonstrated significant differences in implicit motives across age and gender. All implicit motive scores were decreased in aged participants. These results show that there are changes in implicit motives over the course of life. The common stability assumption in

ACCEPTED MANUSCRIPT


adult personality for dispositional factors is not tenable for implicit motives. Similar to personality traits, implicit motives differ over the course of life.

Acknowledgments

This research has been funded by the Swiss National Science Foundation (SNSF: CRSI11_133004/1) to Guy Bodenmann, Veronika Brandstätter, Mike Martin, Fridtjof W. Nussbeck, and Thomas N. Bradbury.

References

Amodio, D. M., Master, S. L., Yee, C. M., & Taylor, S. E. (2008). Neurocognitive components of the behavioral inhibition and activation systems: implications for theories of self-regulation. *Psychophysiology*, *45*, 11–19. doi:10.1111/j.1469-8986.2007.00609.x

Bailey, & Henry. (2008). Growing less empathic with age: Disinhibition of the self-perspective. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 63*, 219–226.

Bernardi, L., Ryser, V.-A., & Le Goff, J.-M. (2011). Gender role-set family orientations, and fertility intentions in Switzerland. *Swiss Journal of Sociology*, *39*, 9–31. doi:10.12682/lives.2296-1658.2011.5

ACCEPTED MANUSCRIPT


Bernecker, K., & Job, V. (2011). Assessing implicit motives with an online version of the picture story exercise. *Motivation and Emotion*, *35*, 251–266. doi:10.1007/s11031-010-9175-8

Biernat, M. (1989). Motives and values to achieve: Different constructs with different effects. *Journal of Personality, 57,* 69–95.

Bliese, P. D. (2000). Within-group agreement, non-independence, and reliability: Implications for data aggregation and analysis. In K. J. Klein & S. W. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations. Foundations, extensions, and new directions* (pp. 349–381). San Francisco, CA: Jossey-Bass.

Brunstein, J. C., & Hoyer, S. (2002). Implizites und explizites Leistungsstreben: Befunde zur Unabhängigkeit zweier Motivationssysteme. [Implicit versus explicit achievement strivings: Empirical evidence of the independence of two motivational systems]. *Zeitschrift für Pädagogische Psychologie, 16*, 51–62.

Coan, J. A., & Allen, J. J. B. (2003). Frontal EEG asymmetry and the behavioral activation and inhibition systems. *Psychophysiology*, *40*, 106–114. doi:10.1111/1469-8986.00011

Conrad, C. D., & Bimonte-Nelson, H. A. (2010). Impact of the hypothalamic–pituitary–adrenal/gonadal axes on trajectory of age-related cognitive decline. In L. Martini (Ed.), *Progress in Brain Research. Neuroendocrinology. Pathological situations and diseases* (Vol. 182, pp. 31–76). Elsevier.

deCharms, R., Morrison, H. W., Reitman, W., & McClelland, D. C. (1955). Behavioral correlates of directly and indirectly measured achievement motivation. In D. C. McClelland (Ed.), *The Century psychology series. Studies in motivation* (pp. 414–423). New York: Appleton-Century-Crofts.

ACCEPTED MANUSCRIPT

ACCEPTED MANUSCRIPT


Dolcos, F., Rice, H. J., & Cabeza, R. (2002). Hemispheric asymmetry and aging: Right hemisphere decline or asymmetry reduction. *Neuroscience & Biobehavioral Reviews*, *26*, 819–825. doi:10.1016/S0149-7634(02)00068-4

Drescher, A., & Schultheiss, O. C. (2016). Meta-analytic evidence for higher implicit affiliation and intimacy motivation scores in women, compared to men. *Journal of Research in Personality.* doi:10.1016/j.jrp.2016.06.019

Entwisle, D. R. (1972). To dispel fantasies about fantasy-based measures of achievement motivation. *Psychological Bulletin, 77*, 377–391. doi:10.1037/h0020021

Ferrari, E., Cravello, L., Muzzoni, B., Casarotti, D., Paltro, M., Solerte, S., . . . Magri, F. (2001). Age-related changes of the hypothalamic-pituitary-adrenal axis: pathophysiological correlates. *European Journal of Endocrinology, 144*, 319–329. doi:10.1530/eje.0.1440319

Ferrini, Rebecca, L., & Barrett-Connor, E. (1998). Sex hormones and age: a cross-sectional study of testosterone and estradiol and their bioavailable fractions in community-dwelling men. *Journal of Epidemiology, 147*, 750–754.

Franz, C. E. (1994). Does thought content change as individuals age? A longitudinal study of midlife adults. In T. F. Heatherton & J. L. Weinberger (Eds.), *Can personality change?* (pp. 227–249). Washington, DC, US: American Psychological Association.

Freund, A. M., Hennecke, M., & Riediger, M. (2010). Age-related differences in outcome and process goal focus. *European Journal of Developmental Psychology*, *7*, 198–222. doi:10.1080/17405620801969585

Gino, F., Wilmuth, C. A., & Brooks, A. W. (2015). Compared to men, women view professional advancement as equally attainable, but less desirable. *Proceedings of the National Academy of Sciences of the United States of America*, *112*, 12354–12359. doi:10.1073/pnas.1502567112

ACCEPTED MANUSCRIPT


Gray, J. A. (1982). *The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system*. Oxford: Oxford University Press.

Gross, J. J., Carstensen, L. L., Pasupathi, M., Tsai, J., Götestam Skorpen, C., & Hsu, Angie Y. C. (1997). Emotion and aging: Experience, expression, and control. *Psychology and aging, 12*, 590–599. doi:10.1037/0882-7974.12.4.590

Hennecke, M., & Freund, A. M. (2010). Staying on and getting back on the wagon: age-related improvement in self-regulation during a low-calorie diet. *Psychology and aging, 25*, 876–885. doi:10.1037/a0019935

Hennecke, M., & Freund, A. M. (2015). Age, action orientation, and self-regulation during the pursuit of a dieting goal. *Applied psychology. Health and well-being.* doi:10.1111/aphw.12060

Hennecke, M., & Freund, A. M. (in press). The development of goals and motivation. Chapter for J. Specht (Ed.), *Personality development across the life-span.* Oxford, UK: Elsevier.

Hewig, J., Hagemann, D., Seifert, J., Naumann, E., & Bartussek, D. (2004). On the selective relation of frontal cortical asymmetry and anger-out versus anger-control. *Journal of Personality and Social Psychology*, *87*, 926–939. doi:10.1037/0022-3514.87.6.926

Hippel, W. von, & Dunlop, S. M. (2005). Aging, inhibition, and social inappropriateness. *Psychology and Aging*, *20*, 519–523. doi:10.1037/0882-7974.20.3.519

Jenkins, S. R. (1987). Need for achievement and women's careers over 14 years: Evidence for occupational structure effects. *Journal of Personality and Social Psychology, 53*, 922–932. doi:10.1037/0022-3514.53.5.922

ACCEPTED MANUSCRIPT


Jenkins, S. R. (1994). Need for power and women's careers over 14 years: Structural power, job satisfaction, and motive change. *Journal of Personality and Social Psychology, 66*, 155–165. doi:10.1037/0022-3514.66.1.155

Job, V., Bernecker, K., & Dweck, C. S. (2012). Are implicit motives the need to feel certain affect? Motive-affect congruence predicts relationship satisfaction. *Personality & Social Psychology Bulletin, 38*, 1552–1565. doi:10.1177/0146167212454920

Job, V., & Brandstätter, V. (2009). Get a taste of your goals: Promoting motive-goal congruence through affect-focus goal fantasy. *Journal of Personality, 77*, 1527–1560. doi:10.1111/j.1467-6494.2009.00591.x

Keil, A., & Freund, A. M. (2009). Changes in the sensitivity to appetitive and aversive arousal across adulthood. *Psychology and aging, 24*, 668–680. doi:10.1037/a0016969

Kelso, M., Cahn, N., & Miller, B. (2012). *Gender equality in employment - policies and practices in Switzerland and the U.S.* George Washington University, Washington DC. Retrieved from https://www.gwu.edu/~igis/assets/docs/report-gender-equality-switzerland-2012.pdf

Mason, A., & Blankenship, V. (1987). Power and affiliation motivation, stress, and abuse in intimate relationships. *Journal of Personality & Social Psychology, 52*, 203–210.

Massey, E. K., Gebhardt, W. A., & Garnefski, N. (2008). Adolescent goal content and pursuit: A review of the literature from the past 16 years. *Developmental Review*, *28*(4), 421–460. doi:10.1016/j.dr.2008.03.002

McAdams, D. P. (1980). A thematic coding system for the intimacy motive. *Journal of Research in Personality, 14*, 413–432. doi:10.1016/0092-6566(80)90001-X

ACCEPTED MANUSCRIPT


McAdams, D. P., & Constantian, C. A. (1983). Intimacy and affiliation motives in daily living: An experience sampling analysis. *Journal of Personality and Social Psychology, 45*, 851–861. doi:10.1037/0022-3514.45.4.851

McAdams, D. P., Lester, R. M., Brand, P. A., McNamara, W. J., & Lensky, D. B. (1988). Sex and the TAT: Are women more intimate than men? Do men fear intimacy? *Journal of personality assessment, 52*, 397–409. doi:10.1207/s15327752jpa5203_1

McAdams, D. P., & Vaillant, G. E. (1982). Intimacy motivation and psychosocial adjustment: a longitudinal study. *Journal of personality assessment, 46*, 586–593. doi:10.1207/s15327752jpa4606_5

McClelland, D. (1980). Motive dispositions: The merits of operant and respondent measures. *Review of personality and social psychology, 1,* 10–41.

McClelland, D. C. (1985). *Human motivation*. Glenview, IL: Scott, Foresman.

McClelland, D. C., Atkinson, J. W., Clark, R. A., & Lowell, E. L. (1953). *The achievement motive*. *Century psychology series*. New York: Appleton-Century-Crofts.

McClelland, D. C., & Boyatzis, R. E. (1982). Leadership motive pattern and long-term success in management. *Journal of Applied Psychology, 67*, 737–743. doi:10.1037/0021-9010.67.6.737

McClelland, D. C., Davis, W. N., Kalin, R., & Wanner, E. (1972). *The drinking man*. New York, NY: The Free Press.

McClelland, D. C., Koestner, R., & Weinberger, J. (1989). How do self-attributed and implicit motives differ? *Psychological Review, 96*, 690–702. doi:10.1037/0033-295X.96.4.690

McClelland, D. C., Patel, V., Stier, D., & Brown, D. (1987). The relationship of affiliative arousal to dopamine release. *Motivation and Emotion, 11*, 51–66. doi:10.1007/BF00992213

ACCEPTED MANUSCRIPT


McClelland, D. C., & Pilon, D. A. (1983). Sources of adult motives in patterns of parent behavior in early childhood. *Journal of Personality and Social Psychology, 44*, 564–574. doi:10.1037/0022-3514.44.3.564

McClelland, D. C., Scioli, A., & Weaver, S. (1998). The Effect of implicit and explicit motivation on recall among old and young adults. *The International Journal of Aging and Human Development, 46*, 1–20. doi:10.2190/R6N6-PK5V-EGPN-QG2X

Morales-Vives, F., & Vigil-Colet, A. (2012). Are old people so gentle? Functional and dysfunctional impulsivity in the elderly. *International Psychogeriatrics*, *24*, 465–471. doi:10.1017/S104161021100161X

Morgan, C. D., & Murray, H. A. (1935). A method for investigating fantasies: the thematic apperception test. *Archives of Neurology & Psychiatry, 34*, 289-206. doi:10.1001/archneurpsyc.1935.02250200049005

Nezlek, J. B. (2008). An introduction to multilevel modeling for social and personality psychology. *Social and Personality Psychology Compass*, *2*, 842–860. doi:10.1111/j.1751-9004.2007.00059.x

North, M., & Fiske, S. (2014). Social categories create and reflect inequality: Psychological and sociological insights. In J. T. Cheng, J. L. Tracy, & C. Anderson (Eds.), *The psychology of social status* (pp. 243–265). New York, NY: Springer.

Pang, J. S. (2010). Content coding methods in implicit motive assessment: Standards of measurement and best practices for the picture story exercise. In O. C. Schultheiss & J. C. Brunstein (Eds.), *Implicit motives* (pp. 119–150). Oxford, New York: Oxford University Press.

ACCEPTED MANUSCRIPT

ACCEPTED MANUSCRIPT


Pang, J. S., & Schultheiss, O. C. (2005). Assessing implicit motives in U.S. college students: Effects of picture type and position, gender and ethnicity, and cross-cultural comparisons. *Journal of personality assessment, 85*, 280–294. doi:10.1207/s15327752jpa8503_04

Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interactions in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics, 31*, 437–448. doi:10.3102/10769986031004437

Reuman, D. A. (1982). Ipsative behavioral variability and the quality of thematic apperceptive measurement of the achievement motive. *Journal of Personality and Social Psychology, 43*, 1098–1110. doi:10.1037/0022-3514.43.5.1098

Röcke, C., & Brose, A. (2013). Intraindividual variability and stability of affect and well-being. *GeroPsych, 26*, 185–199. doi:10.1024/1662-9647/a000094

Röcke, C., Li, S.-C., & Smith, J. (2009). Intraindividual variability in positive and negative affect over 45 days: do older adults fluctuate less than young adults? *Psychology and Aging*, *24*, 863–878. doi:10.1037/a0016276

Rutherford, H. J. V., & Lindell, A. K. (2011). Thriving and surviving: Approach and avoidance motivation and lateralization. *Emotion Review*, *3*, 333–343. doi:10.1177/1754073911402392

Scheibe, S., & Carstensen, L. L. (2010). Emotional aging: recent findings and future trends. *The journals of gerontology. Series B, Psychological sciences and social sciences*, *65B*, 135–144. doi:10.1093/geronb/gbp132

Schultheiss, O. C. (2008). Implicit motives. In John, O., P., Robins, R., W., & Pervin, L., A. (Eds.), *Handbook of personality: Theory and research* (3rd ed., pp. 603–633). New York: Guilford Press.

ACCEPTED MANUSCRIPT

ACCEPTED MANUSCRIPT


Schultheiss, O. C., & Brunstein, J. C. (2001). Assessment of implicit motives with a research version of the TAT: picture profiles, gender differences, and relations to other personality measures. *Journal of personality assessment, 77*, 71–86. doi:10.1207/S15327752JPA7701_05

Schultheiss, O. C., & Brunstein, J. C. (2002). Inhibited power motivation and persuasive communication: A lens model analysis. *Journal of Personality, 70*, 553–582. doi:10.1111/1467-6494.05014

Schultheiss, O. C. (2013). The hormonal correlates of implicit motives. *Social and Personality Psychology Compass, 7*, 52–65. doi:10.1111/spc3.12008

Schultheiss, O. C., & Brunstein, J. C. (1999). Goal imagery: Bridging the gap between implicit motives and explicit goals. *Journal of Personality, 67*, 1–38. doi: 10.1111/1467-6494.00046

Schultheiss, O. C., Liening, S. H., & Schad, D. (2008). The reliability of a Picture Story Exercise measure of implicit motives: Estimates of internal consistency, retest reliability, and ipsative stability. *Journal of Research in Personality, 42*, 1560–1571. doi:10.1016/j.jrp.2008.07.008

Schultheiss, O. C., Pang, J. S., Robins, R. W., Fraley, R. C., & Krueger, R. (2007). Measuring implicit motives. *Handbook of research methods in personality psychology,* 322–344.

Schultheiss, O. C., & Rohde, W. (2002). Implicit power motivation predicts men's testosterone changes and implicit learning in a contest situation. *Hormones and Behavior, 41*, 195–202. doi:10.1006/hbeh.2001.1745

Schultheiss, O. C., Riebel, K., & Jones, N. M. (2009). Activity inhibition: A predictor of lateralized brain function during stress? *Neuropsychology*, *23*, 392–404. doi:10.1037/a0014591

ACCEPTED MANUSCRIPT

ACCEPTED MANUSCRIPT


Schultheiss, O. C., Wiemers, U. S., & Wolf, O. T. (2014). Implicit need for achievement predicts attenuated cortisol responses to difficult tasks. *Journal of Research in Personality, 48*, 84–92. doi:10.1016/j.jrp.2013.10.004

Smith, C. P., Feld, S. C., & Franz, C. E. (1992). Methodological considerations: steps in research employing content analysis systems. In C. P. Smith (Ed.), *Motivation and personality. Handbook of thematic content analysis* (pp. 515–536). Cambridge [England], New York, NY, USA: Cambridge University Press. doi:10.1017/CBO9780511527937.038

Specht, J., Egloff, B., & Schmukle, S. C. (2011). Stability and change of personality across the life course: the impact of age and major life events on mean-level and rank-order stability of the Big Five. *Journal of Personality and Social Psychology, 101*, 862–882. doi:10.1037/a0024950

Stewart, A. J., & Chester, N. L. (1982). Sex differences in human social motives: Achievement, affiliation, and power. *Motivation and society,* 172–218.

Sutton, S. K., & Davidson, R. J. (1997). Prefrontal brain asymmetry: A biological substrate of the behavioral approach and inhibition systems. *Psychological Science*, *8*, 204–210. doi:10.1111/j.1467-9280.1997.tb00413.x

Valero, D., Nikitin, J., & Freund, A. (2014). The effect of age and time perspective on implicit motives. *Motivation and Emotion*, (2), 175–181. doi:10.1007/s11031-014-9453-y

Veroff, J., Reuman, D., & Feld, S. (1984). Motives in american men and women across the adult life span. *Developmental Psychology, 20*(6), 1142–1158. doi:10.1037/0012-1649.20.6.1142

Winter, D. G. (1994). *Manual for scoring motive imagery in running text*. Ann Arbor.

ACCEPTED MANUSCRIPT

ACCEPTED MANUSCRIPT


Yang, F., Ramsay, J. E., Schultheiss, O. C., & Pang, J. S. (2015). Need for achievement moderates the effect of motive-relevant challenge on salivary cortisol changes. *Motivation and Emotion, 39*, 321–334. doi:10.1007/s11031-014-9465-7

Footnotes

[1] Post-hoc power-analyses revealed a power of 1- β = .98 to detect a relationship between two variables with a small effect of $r = .15$ ($\alpha = 0.05$).

[2] In the literature, a small internal consistency of motive scores is mentioned as a problem (e.g. Entwisle, 1972). This lack of consistency is due to the deliberate use of different picture cues, resulting in heterogeneous items (Schultheiss, Liening, & Schad, 2008). However, the underlying aim of a good measurement is in first place to capture the construct of interest, or, in other words, to achieve a high validity. In the case of the PSE, using heterogeneous items leads to a broad caption of the different individual implicit motives and therefore to a high variability (Pang, 2010). There is research showing that high variability leads to high validity regardless of the internal consistency (Reuman, 1982). This research supports the assumption that the classical reliability theory is not applicable for PSE measures.

[3] These picture cues correspond to the standardized picture cue set of Schultheiss and Brunstein (2001). We selected these picture cues because they have a high pull for different implicit motives and, thus, maximize the variance of the measurement.

[4] Because it is probable that coders' implicit motives and gender bias the motive score of the coded text, it is important to control for the influence of the particular coder.

ACCEPTED MANUSCRIPT



Table 1

*Highest Degree of Education Separated for Gender and Age Groups*

| | Women | | | | Men | | | |
|---|---|---|---|---|---|---|---|---|
| | Total | G1 | G2 | G3 | Total | G1 | G2 | G3 |
| University degree (%) | 31.8 | 45.5 | 32.0 | 17.6 | 49.3 | 42.6 | 58.9 | 46.3 |
| High school (%) | 21.4 | 25.6 | 20.0 | 18.5 | 12.5 | 23.8 | 5.6 | 8.3 |
| Vocational training (%) | 40.5 | 25.6 | 46.4 | 49.6 | 34.9 | 31.1 | 34.7 | 38.8 |
| Secondary school (%) | 3.8 | 3.3 | 1.6 | 6.7 | 1.9 | 1.6 | 0.8 | 3.3 |
| Primary school (%) | 2.5 | 0.0 | 0.0 | 7.6 | 1.4 | 0.8 | 0.0 | 3.3 |

Note. G1 = young adults; G2 = middle-aged adults; G3 = aged adults.

Table 2

*Two-Tailed Correlations of Motive Scores, Activity Inhibition and Age*

| *Variable* | *n*Ach | *n*Aff | *n*Int | *n*Pow | Inhibition | Age |
|---|---|---|---|---|---|---|
| *n*Ach | — | -.03 | .05 | .12* | -.11 | -.03 |
| *n*Aff | .13* | — | .51** | -.14** | .12* | -.04 |
| *n*Int | .12* | .51** | — | -.09 | -.16** | -.12* |
| *n*Pow | .05 | -.04 | -.06 | — | .10 | .00 |
| Inhibition | -.22** | -.19** | -.22** | .01 | — | .08 |
| Age | -.09 | -.11* | -.15** | -.16** | .14** | — |

Note. Correlations are computed with motive scores residualized for protocol length. Correlations of women ($N$ = 367) are represented above the diagonal, correlations of men ($N$ = 368) are represented below the diagonal. *n*Ach = Achievement motive; *n*Aff = Affiliation motive; *n*Int = Intimacy motive; *n*Pow = Power motive; Inhibition = Activity Inhibition.

** $p < .01$; * $p < .05$.

ACCEPTED MANUSCRIPT

ACCEPTED MANUSCRIPT



Table 3

*Descriptive Statistics of Motive Scores, Written Words and Age*

| | Women | | | | Men | | | |
|---|---|---|---|---|---|---|---|---|
| *Variable* | Total | G1 (*n* = 122) | G2 (*n* = 125) | G3 (*n* = 120) | Total | G1 (*n* = 122) | G2 (*n* = 125) | G3 (*n* = 121) |
| *n*Ach | 1.53 (1.30) | 1.81 (1.48) | 1.67 (1.24) | 1.10 (1.02) | 1.55 (1.40) | 1.98 (1.62) | 1.61 (1.31) | 1.07 (1.07) |
| *n*Aff | 3.86 (1.97) | 4.57 (1.95) | 4.02 (1.90) | 2.98 (1.71) | 3.02 (1.74) | 3.38 (1.65) | 3.34 (2.59) | 2.33 (1.62) |
| *n*Int | 4.05 (2.73) | 5.20 (2.92) | 4.33 (2.61) | 2.70 (1.98) | 3.07 (2.59) | 3.75 (2.97) | 3.41 (2.59) | 2.04 (1.74) |
| *n*Pow | 1.92 (1.72) | 2.40 (1.83) | 2.04 (1.68) | 1.31 (1.47) | 1.96 (1.57) | 2.66 (1.63) | 1.95 (1.49) | 1.27 (1.26) |
| Inhibition | 2.97 (2.40) | 3.53 (2.28) | 3.10 (2.36) | 2.27 (2.41) | 2.85 (2.42) | 3.02 (2.34) | 3.38 (2.78) | 2.12 (1.87) |
| Words | 404.28 (132.51) | 474.93 (97.98) | 446.76 (109.68) | 288.19 (105.37) | 355.61 (116.41) | 402.26 (88.59) | 401.29 (104.85) | 261.39 (93.98) |
| Age | 47.23 (18.36) | 26.25 (4.55) | 45.92 (4.50) | 69.93 (4.71) | 49.30 (18.30) | 28.15 (4.71) | 48.37 (4.31) | 71.60 (5.08) |

Note. Mean scores and standard deviations (in parantheses) are given. Both are computed with raw motive scores. G1 = young adults; G2 = middle-aged adults; G3 = aged adults. *n*Ach = Achievement motive; *n*Aff = Affiliation motive; *n*Int = Intimacy motive; *n*Pow = Power motive; Inhibition = Activity Inhibition; Words = Number of written words.

ACCEPTED MANUSCRIPT

ACCEPTED MANUSCRIPT


Table 4

*Multilevel Regression of the Implicit Achievement Motive*

| Variable | Parameter estimate | *SE* | *df* | t | 95 % CI |
|---|---|---|---|---|---|
| (Intercept) | 1.697 | 0.18 | 365 | 9.36*** | 1.341, 2.054 |
| Gender | 0.197 | 0.09 | 362 | 2.23* | 0.023, 0.372 |
| Age | -0.008 | 0.00 | 362 | -2.52* | -0.014, -0.002 |
| Words | 0.003 | 0.00 | 362 | 7.39*** | 0.002, 0.004 |
| Coder 1 | 0.243 | 0.21 | 365 | 1.14 | -0.177, 0.664 |
| Coder 2 | -0.256 | 0.19 | 362 | -1.35 | -0.628, 0.116 |
| Coder 3 | -0.112 | 0.22 | 365 | -0.50 | -0.554, 0.330 |
| Coder 4 | -0.646 | 0.20 | 362 | -3.27** | -1.034, -0.258 |

Note. Gender was coded as 0 = women, 1 = men; Coder 1 to Coder 4 were coded as 1 = $coder_x$, 0 = all others; Different dfs for coders result from the fact that they coded different numbers of stories. Age and number of words were centered on the grand mean.
*** $p < .001$; ** $p < .01$; * $p < .05$.

Table 5

*Multilevel Regression of the Implicit Power Motive*

| Variable | Parameter estimate | *SE* | *df* | t | 95 % CI |
|---|---|---|---|---|---|
| (Intercept) | 2.147 | 0.21 | 365 | 10.13*** | 1.730, 2.563 |
| Gender | 0.320 | 0.11 | 362 | 2.98** | 0.109, 0.531 |
| Age | -0.009 | 0.00 | 362 | -2.60** | -0.016, -0.002 |
| Words | 0.005 | 0.00 | 362 | 10.16*** | 0.004, 0.006 |
| Coder 1 | -0.192 | 0.25 | 365 | -0.78 | -0.680, 0.295 |
| Coder 2 | -0.540 | 0.22 | 362 | -2.44* | -0.975, -0.105 |
| Coder 3 | -0.198 | 0.26 | 365 | -0.76 | -0.710, 0.314 |
| Coder 4 | -0.371 | 0.23 | 362 | -1.62 | -0.822, -0.080 |

Note. Gender was coded as 0 = women, 1 = men; Coder 1 to Coder 4 were coded as 1 = $coder_x$, 0 = all others; Different dfs for coders result from the fact that they coded different numbers of stories. Age and number of words were centered on the grand mean.
*** $p < .001$; ** $p < .01$; * $p < .05$.

ACCEPTED MANUSCRIPT

ACCEPTED MANUSCRIPT


Table 6

*Multilevel Regression of the Implicit Affiliation Motive*

| Variable | Parameter estimate | *SE* | *df* | t | 95 % CI |
|---|---|---|---|---|---|
| (Intercept) | 3.754 | 0.25 | 365 | 15.26*** | 3.270, 4.238 |
| Gender | -0.560 | 0.12 | 362 | -4.55*** | -0.802, -0.318 |
| Age | -0.012 | 0.00 | 362 | -2.83** | -0.020, -0.004 |
| Words | 0.005 | 0.00 | 362 | 8.64*** | 0.004, 0.006 |
| Coder 1 | 0.468 | 0.29 | 365 | 1.62 | -0.100, 1.036 |
| Coder 2 | -0.079 | 0.26 | 362 | -0.31 | -0.584, 0.426 |
| Coder 3 | 0.088 | 0.30 | 365 | 0.29 | -0.508, 0.685 |
| Coder 4 | -0.290 | 0.27 | 362 | -1.09 | -0.815, 0.235 |

Note. Gender was coded as 0 = women, 1 = men; Coder 1 to Coder 4 were coded as 1 = $coder_x$, 0 = all others; Different dfs for coders result from the fact that they coded different numbers of stories. Age and number of words were centered on the grand mean.
*** $p < .001$; ** $p < .01$; * $p < .05$.

Table 7

*Multilevel Regression of the Implicit Intimacy Motive*

| Variable | Parameter estimate | *SE* | *df* | t | 95 % CI |
|---|---|---|---|---|---|
| (Intercept) | 3.735 | 0.17 | 366 | 22.06*** | 3.402, 4.068 |
| Gender | -0.645 | 0.18 | 364 | -3.57*** | -1.000, -0.290 |
| Age | -0.026 | 0.01 | 364 | -4.36*** | -0.038, -0.014 |
| Words | 0.006 | 0.00 | 364 | 6.60*** | 0.004, 0.008 |
| Coder | 0.254 | 0.19 | 366 | 1.37 | -0.111, 0.620 |

Note. Gender was coded as 0 = women, 1 = men; Coder was coded as 0 = first coder, 1 = second coder. Age and number of words were centered on the grand mean.
*** $p < .001$; ** $p < .01$; * $p < .05$.

ACCEPTED MANUSCRIPT

ACCEPTED MANUSCRIPT


Table 8

*Multilevel Regression of Activity Inhibition*

| Variable | Parameter estimate | *SE* | *df* | t | 95 % CI |
|---|---|---|---|---|---|
| (Intercept) | 2.713 | 0.11 | 367 | 25.07*** | 2.501, 2.926 |
| Gender | 0.393 | 0.15 | 364 | 2.62** | 0.098, 0.688 |
| Age | 0.018 | 0.01 | 364 | 3.59*** | 0.008, 0.028 |
| Words | 0.011 | 0.00 | 364 | 15.40*** | 0.010, 0.013 |

Note. Gender was coded as 0 = women, 1 = men. Age and number of words were centered on the grand mean.
*** $p < .001$; ** $p < .01$; * $p < .05$.

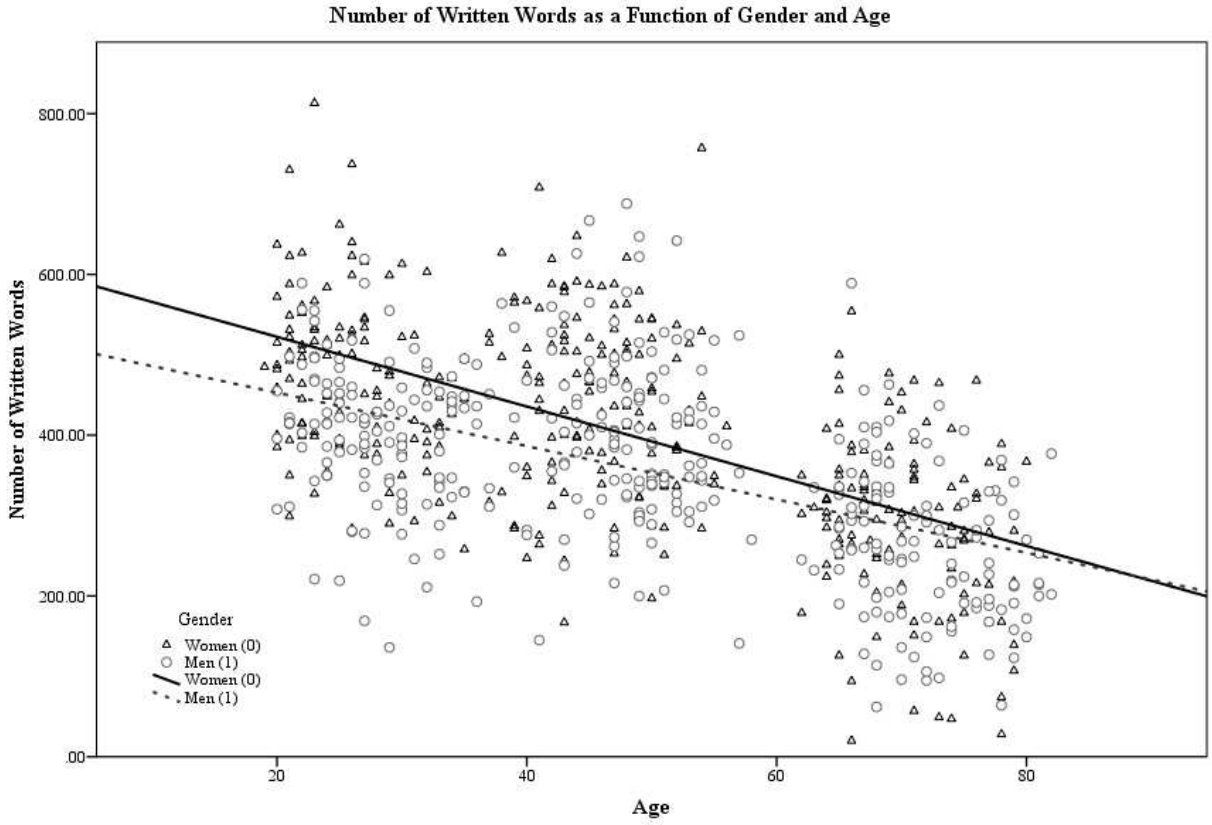
ACCEPTED MANUSCRIPT

## Figure Captions

*Figure 1.* Number of written words as a function of gender and age.

ACCEPTED MANUSCRIPT






ACCEPTED

ACCEPTED MANUSCRIPT



**Highlights**

- Implicit motives are important personality characteristics
- We investigated age and gender differences in implicit motives
- Research on this topic is rare and shows contradictory results
- Aged adults scored lower on all motives as compared to young adults
- Results also revealed gender differences

ACCEPTED MANUSCRIPT